UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/925,579	08/09/2001	Akira Nakano	9281-4140	2869

7590 06/06/2006

Brinks Hofer Gilson & Lione
P.O. Box 10395
Chicago, IL 60610

EXAMINER	
ZERVIGON, RUDY	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 06/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/925,579	Applicant(s) NAKANO ET AL.	
	Examiner Rudy Zervigon	Art Unit 1763	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 63-70* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 63-70* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unsure what "characteristics" applicant refers.

3. Claims 1-9, and 63-65 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant claims in claim 1 and 63 "is determined from electrical radio frequency factors of the plasma processing chamber and respective constituent elements". It is unsure what "factors" and "respective constituent elements" applicant refers.

4. Claims 66-68 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant claims in claim 66 "structural factors". It is unsure what "factors" applicant refers.

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1-6, 8, 9, and 64-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murata et al (USPat. 5,423,915) in view of Patrick (USPat. 5,474,648). Murata et al (USPat. 5,423,915) teaches:

A plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) comprising: a plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line 11) having a plasma excitation electrode (2; Figure 1; column 5; line 44 - column 6; line 11) for exciting a plasma; a radio frequency generator (4; Figure 1; column 5; line 44 - column 6; line 11) for supplying a radio frequency voltage to the electrode (2; Figure 1; column 5; line 44 - column 6; line 11); a radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11) connected to the electrode (2; Figure 1; column 5; line 44 - column 6; line 11); and a matching circuit (104; Figure 1; column 5; line 44 - column 6; line 11) having an input terminal (104/4 interface; Figure 1; column 5; line 44 - column 6; line 11) and an output (106, 109; Figure 1; column 5; line 44 - column 6; line 11) end, wherein the input terminal (104/4 interface; Figure 1; column 5; line 44 - column 6; line 11) is connected to the radio frequency generator (4; Figure 1; column 5; line 44 - column 6; line 11) and the output (106, 109; Figure 1; column 5; line 44 - column 6; line 11) end is connected to an end of the radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11) so as to achieve impedance matching between the plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line 11) and the radio frequency generator (4; Figure 1; column 5; line 44 - column 6; line 11) – claim 1

Murata further teaches applying a frequency of 13.56MHz (column 5; lines 48-55) to both the plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line 11) and the plasma excitation electrode (2; Figure 1; column 5; line 44 - column 6; line 11).

Murata further teaches:

i. A plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) comprising: a plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line

11) having a first series resonant frequency f_0 and a plasma excitation electrode (2; Figure 1; column 5; line 44 - column 6; line 11) for exciting a plasma; a radio frequency generator (4; Figure 1; column 5; line 44 - column 6; line 11) for supplying a radio frequency voltage to the electrode (2; Figure 1; column 5; line 44 - column 6; line 11); a radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11) connected to the electrode (2; Figure 1; column 5; line 44 - column 6; line 11); and a matching circuit (104; Figure 1; column 5; line 44 - column 6; line 11) having an input terminal (104/4 interface; Figure 1; column 5; line 44 - column 6; line 11) and an output (106, 109; Figure 1; column 5; line 44 - column 6; line 11) end, wherein the input terminal (104/4 interface; Figure 1; column 5; line 44 - column 6; line 11) is connected to the radio frequency generator (4; Figure 1; column 5; line 44 - column 6; line 11) and the output (106, 109; Figure 1; column 5; line 44 - column 6; line 11) end is connected to an end of the radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11) so as to achieve impedance matching between the plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line 11) and the radio frequency generator (4; Figure 1; column 5; line 44 - column 6; line 11) – claim 66

Murata does not teach a frequency which is three times a first series resonant frequency f_0 of the plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line 11) which is measured at the end of the radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11) is larger than a power frequency f_e of the radio frequency waves, and wherein <u>the first series resonant frequency f_0 is determined from electrical radio frequency factors of the plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line 11) and respective</u>

constituent elements disposed near the plasma processing chamber, the first series resonant frequency f_0 corresponds to a minimum impedance of the plasma processing chamber, the minimum impedance evaluated with the plasma chamber disconnected from the plasma apparatus during a non-discharge period – claim 1. Applicant's claim limitation of "wherein the first series resonant frequency f_0 corresponds to a minimum impedance of the plasma processing chamber, the minimum impedance evaluated with the plasma chamber disconnected from the plasma apparatus during a non-discharge period" appears to be a claim recitation of intended use in thepending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

Murata further does not teach:

i. A plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) according to claim 1, wherein a frequency of 1.3 times the first series resonant frequency f_0 is larger than a power frequency f_e - claim 2

ii. A plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) according to claim 2, wherein the first series resonant frequency f_0 is larger than three times the power frequency f_e. – claim 3

iii. A plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) according to claim 3, wherein a series resonant frequency f_0, which is defined by a capacitance between the plasma excitation electrode (2; Figure 1; column 5; line 44 - column 6; line 11) and a counter electrode (3; Figure 1; column 5; line 44 - column 6; line 11) for generating the plasma in cooperation with the plasma excitation electrode (2; Figure 1; column 5; line 44 - column 6; line 11) is larger than three times the power frequency f_e. – claim 4

iv. A plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) according to claim 4, wherein the plasma excitation electrode (2; Figure 1; column 5; line 44 - column 6; line 11) and the counter electrode (3; Figure 1; column 5; line 44 - column 6; line 11) are of a parallel plate type, and the series resonant frequency f_0, and the power frequency f_e satisfy the relationship:

$$f_0' > \sqrt{\frac{d}{\delta}} f_e$$

wherein d represents the distance between the plasma excitation electrode (2; Figure 1; column 5; line 44 - column 6; line 11) and the counter electrode (3; Figure 1; column 5; line 44 - column 6; line 11), and δ represents the sum of the distance between the plasma excitation electrode (2; Figure 1; column 5; line 44 - column 6; line 11) and the generated plasma and the distance between the counter electrode (3; Figure 1; column 5; line 44 - column 6; line 11) and the generated plasma – claim 5

Murata further does not teach:

v. A plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) according to claim 1, further comprising a resonant frequency measuring terminal for measuring the resonant frequency of the plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line 11), in the vicinity of the end of the radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11) – claim 6

vi. A plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) according to claim 6, further comprising a resonant frequency measuring unit which is detachably connected to the resonant frequency measuring terminal – claim 8

vii. A plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) according to claim 8, wherein the resonant frequency characteristics in the plasma excitation mode and the resonant frequency characteristics in the measuring mode are set to be equal to each other – claim 9

viii. The plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) according to claim 1, wherein the plasma excitation electrode (2; Figure 1; column 5; line 44 - column 6; line 11) comprises an overlapping area (projection of 2 onto 1; Figure 1) with respect to the chamber wall, the overlapping area (projection of 2 onto 1; Figure 1) adapted to set the first series resonant frequency fo such that three times the first series resonant frequency fo is larger than a power frequency fe supplied from the radio frequency generator (4; Figure 1; column 5; line 44 - column 6; line 11), as claimed by claim 64

ix. The plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) according to claim 1, wherein the radio frequency feeder (105; Figure 1; column 5; line

44 - column 6; line 11) has a length adapted to set the first series resonant frequency fo such that three times the first series resonant frequency fo is larger than a power frequency f_e supplied from the radio frequency generator (4; Figure 1; column 5; line 44 - column 6; line 11), as claimed by claim 65

x. wherein the first series resonant frequency fo corresponds to a minimum impedance of the plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line 11), the minimum impedance evaluated with the plasma chamber disconnected from the plasma apparatus during a non-discharge period, and wherein one or more structural factors of the plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) are adjusted such that three times the first series resonant frequency fo is larger than a power frequency f_e supplied from the radio frequency generator (4; Figure 1; column 5; line 44 - column 6; line 11) – claim 66

xi. The plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) according to claim 66, wherein the one or more structural factors are adjusted such that 1.3 times the first series resonant frequency fo is larger than a power frequency f_e, as claimed by claim 67

xii. The plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) according to claim 67, wherein the one or more structural factors are adjusted such that the first series resonant frequency fo is larger than a power frequency f_e, as claimed by claim 68

xiii. The plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) according to claim 66, wherein the one or more structural factors include an overlapping

area of the plasma electrode (2; Figure 1; column 5; line 44 - column 6; line 11) with respect to the chamber wall (1; Figure 1), as claimed by claim 69

xiv. The plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) according to claim 66, wherein the one or more structural factors include a length of the radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11), as claimed by claim 70

Patrick (USPat. 5,474,648) teaches a plasma reactor (104, Figure 2a; column 6; line 54 – column 7; line 25) including a variable RF parameter sensor (202; Figure 2a) which measures power, voltage, current, phase angle, harmonic content (abstract), and impedance parameters at the plasma chamber electrode (112; Figure 2a, claim 5). That Patrick et al measures a frequency, resonant or otherwise, at the plasma chamber electrode is inherent because the applied frequency is that of the dynamic voltage and current that are measured and dynamically controlled (claim 6). The Examiner believes Patrick's apparatus is inherent in setting a frequency f_0 corresponding desired, or optimized values, including "corresponding" a minimum impedance (as measured by Patrick) of the plasma processing chamber. That Patrick can measure the minimum impedance with the plasma chamber disconnected from the plasma apparatus during a non-discharge period, is a claim requirement of intended use. See above.

Patrick further teaches that his plasma processing apparatus (Figure 2a; column 6; line 54 – column 7; line 25) produces frequencies which is defined by a capacitance between the plasma excitation electrode (112; Figure 2a) and a counter electrode (114; Figure 2a) for generating the plasma in cooperation with the plasma excitation electrode (112; Figure 2a). Further when the structure recited in the references is substantially identical to that of the claims, claimed

properties or functions are presumed to be inherent. Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA1977) – MPEP 2114.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Murata to use Patrick et al's system for plasma dynamic control including optimizing the relative frequencies between Murata's plasma excitation electrode and Murata's radio frequency generator depending on the geometry of the plasma chamber and dynamic processing conditions. Motivation for Murata to use Patrick et al's system for plasma dynamic control including optimizing the relative frequencies between Murata's plasma excitation electrode and Murata's radio frequency generator depending on the geometry of the plasma chamber and dynamic processing conditions is for enabling the repeatability and uniformity of plasma etching processes as taught by Patrick et al (column 3; lines 55-65).

It would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele , 406 F.2d 1403, 16_0 USPQ 809 (CCPA 1969); Merck & Co. Inc . v. Biocraft Laboratories Inc. , 874 F.2d 804, 1_0 USPQ2d 1843 (Fed. Cir.), cert. denied , 493 U.S. 975 (1989); In re Kulling , 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05).

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murata et al (USPat. 5,423,915) and Patrick (USPat. 5,474,648) in view of Stramke (USPat. 4,645,981).

Murata and Patrick are discussed above. Murata and Patrick do not teach a switch provided between Murata's radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11) and a resonant frequency measuring terminal, wherein the switch electrically disconnects the end of Murata's radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11) from a resonant frequency measuring terminal and connects the end of Murata's radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11) to Murata's output (106, 109; Figure 1; column 5; line 44 - column 6; line 11) end of Murata's matching circuit (104; Figure 1; column 5; line 44 - column 6; line 11) in a plasma excitation mode in which the plasma is excited, whereas the switch electrically connects the end of Murata's radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11) to the resonant frequency measuring terminal and disconnects the end of Murata's radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11) from the resonant frequency measuring terminal in a measuring mode in which the resonant frequency of the plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line 11) is measured.

Stramke teaches a capacitive plasma processing apparatus (Figure 1; column 3; line 57 – column 4, line 19) including a switch ("S1"; Figure 1; column 3; line 57 – column 4, line 19) for a current sensor (12; Figure 1; column 3; line 57 – column 4, line 19).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Murata and Patrick to add a switch to the RF parameter sensor as taught by Stramke.

Motivation for Murata and Patrick to add a switch to the RF parameter sensor as taught by Stramke is to allow for current sampling durations as taught by Stramke (column 4; lines 46-50).

8. Claims 10, 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murata et al (USPat. 5,423,915) in view of Patrick (USPat. 5,474,648) and Hoke; William E. et al. (US 5077875 A). Murata and Patrick are discussed above, however, Murata teaches a plasma processing apparatus (Figure 1; column 5; line 44 - column 6; line 11) comprising: a plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line 11) having a plasma excitation electrode (2; Figure 1; column 5; line 44 - column 6; line 11) for exciting a plasma, a counter electrode (3; Figure 1; column 5; line 44 - column 6; line 11); a radio frequency generator (4; Figure 1; column 5; line 44 - column 6; line 11) for supplying a radio frequency voltage to the plasma excitation electrode (2; Figure 1; column 5; line 44 - column 6; line 11); a radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11) connected to the plasma excitation electrode (2; Figure 1; column 5; line 44 - column 6; line 11); and a matching circuit (104; Figure 1; column 5; line 44 - column 6; line 11) having an input terminal (104/4 interface; Figure 1; column 5; line 44 - column 6; line 11) and an output (106, 109; Figure 1; column 5; line 44 - column 6; line 11) end, wherein the input terminal (104/4 interface; Figure 1; column 5; line 44 - column 6; line 11) is connected to the radio frequency generator (4; Figure 1; column 5; line 44 - column 6; line 11) and the output (106, 109; Figure 1; column 5; line 44 - column 6; line 11) end is connected to an end of the radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11) so as to achieve impedance matching between the plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line 11) and the radio frequency generator (4; Figure 1; column 5; line 44 - column 6; line 11) – claim 63

Murata does not teach:

i. a shower plate disposed between the plasma excitation electrode (2; Figure 1; column 5; line 44 - column 6; line 11) and the counter electrode (3; Figure 1; column 5; line 44 - column 6; line 11) – claim 63

ii. wherein a frequency which is three times a first series resonant frequency fo of the plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line 11) which is measured at the end of the radio frequency feeder (105; Figure 1; column 5; line 44 - column 6; line 11) is larger than a power frequency f_e of the radio frequency waves, and wherein the first series resonant frequency f_0 is determined from electrical radio frequency factors of the plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line 11) and respective constituent elements disposed near the plasma processing chamber, the first series resonant frequency fo corresponding to a minimum impedance of the plasma processing chamber (1; Figure 1; column 5; line 44 - column 6; line 11), the minimum impedance evaluated with the plasma chamber (1; Figure 1; column 5; line 44 - column 6; line 11) disconnected from the plasma apparatus during a non-discharge period – claim 63

As stated above, Patrick (USPat. 5,474,648) teaches a plasma reactor (104, Figure 2a; column 6; line 54 – column 7; line 25) including a variable RF parameter sensor (202; Figure 2a) which measures power, voltage, current, phase angle, harmonic content (abstract), and impedance parameters at the plasma chamber electrode (112; Figure 2a, claim 5). That Patrick et al measures a frequency, resonant or otherwise, at the plasma chamber electrode is inherent because the applied frequency is that of the dynamic voltage and current that are measured and dynamically controlled (claim 6). The Examiner believes Patrick's apparatus is inherent in

setting a frequency f_0 corresponding desired, or optimized values, including "corresponding" a minimum impedance (as measured by Patrick) of the plasma processing chamber. That Patrick can measure the minimum impedance with the plasma chamber disconnected from the plasma apparatus during a non-discharge period, is a claim requirement of intended use. See above.

Patrick further teaches that his plasma processing apparatus (Figure 2a; column 6; line 54 – column 7; line 25) produces frequencies which is defined by a capacitance between the plasma excitation electrode (112; Figure 2a) and a counter electrode (114; Figure 2a) for generating the plasma in cooperation with the plasma excitation electrode (112; Figure 2a). Further when the structure recited in the references is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA1977) – MPEP 2114.

Hoke teaches a cross flow deposition reactor (Figure 3) similar to Murata's cross flow deposition reactor (7; Figure 1). In particular, Hoke teaches a shower plate (12; Figure 3) at the gas introduction point (15; Figure 3) in the reactor (11; Figure 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Murata to use Patrick et al's system for plasma dynamic control including optimizing the relative frequencies between Murata's plasma excitation electrode and Murata's radio frequency generator depending on the geometry of the plasma chamber and dynamic processing conditions, further, for Murata and Patrick to add Hoke's shower plate (12; Figure 3).

Motivation for Murata to use Patrick et al's system for plasma dynamic control including optimizing the relative frequencies between Murata's plasma excitation electrode and Murata's radio frequency generator depending on the geometry of the plasma chamber and dynamic processing conditions is for enabling the repeatability and uniformity of plasma etching processes as taught by Patrick et al (column 3; lines 55-65), motivation Murata and Patrick to add Hoke's shower plate is for process gas diffusion under laminar flow as taught by Hole (column 7; lines 54-65).

It would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele , 406 F.2d 1403, 16_0 USPQ 809 (CCPA 1969); Merck & Co. Inc . v. Biocraft Laboratories Inc. , 874 F.2d 804, 1_0 USPQ2d 1843 (Fed. Cir.), cert. denied , 493 U.S. 975 (1989); In re Kulling , 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05).

Response to Arguments

9. Applicant's arguments with respect to claims 1-9, and 63-70 have been considered but are moot in view of the new grounds of rejection. The Examiner's new grounds of rejection address Applicant's new claim amendments and arguments in support thereof.

Conclusion

10. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

Rudy Zervigon
6/4/6